AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to Figures 1-3. The sheet, which includes Figures 1 and 2 replaces the original sheet including Figures 1 and 2. The sheet, which includes Figure 3 replaces the original sheet including Figure 3. In Figures 1-3, the view numbers (Figs. 1-3) have been enlarged.

Attachment: Replacement sheets

REMARKS

In response to the Office Action mailed April 16, 2009, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

Discussion of Claim Amendments

Claims 8 and 9 have been cancelled. Claims 1, 3, 4, 6 and 7 have been amended. Upon the entry of the amendments, Claims 1-7 are pending in this application. The amendments to the claims are supported, for example, by the specification at paragraph [0027] of the published application. Thus, the claim amendments do not introduce any new matter. Entry of the amendments is respectfully requested.

Discussion of Specification Amendment

The specification has been amended to correct a technical error. The amendment to the specification is supported, for example, by paragraphs [0024] and [0027] of the published application. Thus, the specification amendment does not introduce any new matter. Entry of the amendment is respectfully requested.

Discussion of Drawing Objection

The Examiner objected to the drawings due to certain informalities. In reply, Applicant has amended the drawings to resolve the issues addressed by the Examiner as reflected in the "AMENDMENTS TO THE DRAWINGS" section. Withdrawal of the objection is respectfully requested.

Discussion of Rejection of Claims under 35 U.S.C. § 102(b)

Claim 7 was rejected under 35 U.S.C. § 102(b) as being anticipated by Yamamura, et al. (U.S. Patent No. 5,154,832). Applicant respectfully submits that Claim 7 is allowable over Yamamura as discussed below.

Rationale of 35 U.S.C. § 102

"For a prior art reference to anticipate a claim under 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 U.S.P.Q. 2d 1315, 1317 (Fed. Cir. 1988).

Discussion of Patentability of Claim 7

Independent Claim 7, as amended, recites, among other things, that the feed-side spacer is adapted to allow air to flow in the feed gas channel with *substantially atmospheric pressure* when *the air is fed by a fan or a blower* having such a capacity that *a maximum feed-air flow rate and a maximum static pressure divided by an effective membrane area of the gas separation membrane are 100 m^3/min m^2 or less and 4000 Pa/m^2 or less*, respectively. Claim 7 additionally recites that the module separates and *recovers oxygen-rich air* from a hollow section by vacuuming the hollow section while feeding the air to a feed gas channel. Applicant respectfully submits that Yamamura does not teach the above-indicated features of the claimed invention as discussed below.

First of all, Applicant would like to point out to the Examiner that Yamamura is directed to a device for removing gas dissolved in liquid by the use of a carrier gas. *See* column 2, lines 44-48 and column 8, lines 5-9, and Figure 3. Thus, the gas to be removed is not fed by a fan or a blower, since it is carried by the carrier gas which subsequently forms a gas stream which includes i) the gas removed from the liquid and ii) the carrier gas. *See* also Figure 3 of Yamamura. In contrast, Claim 7 is directed to obtaining oxygen-rich air from the air. In addition, in Claim 7, the air (from which oxygen-rich air is obtained) is fed by a fan or a blower. *See, for example*, Figure 3 of this application.

In addition, Yamamura does not teach "the feed-side spacer is adapted to allow air to flow in the feed gas channel with *substantially atmospheric pressure*" recited in Claim 7. Instead, Yamamura discloses that the pressure of the supplied gas (64) is maintained to a relatively high pressure. *See* column 9, lines 66-67. According to one embodiment, air is fed into the feed gas channel relatively slowly at substantially atmospheric pressure, which eliminates the need of a pressure resistant container and allows a simple structure. *See, for example*, paragraph [0030] of the published application.

Furthermore, Yamamura does not teach that the module separates and recovers *oxygen-rich air*. Yamamura discloses:

> The carrier gas 14 may be a gas which does not contain the gas to be degasified from the raw liquid, and can be selected depending upon certain factors. For example, in the case where oxygen contained in a raw water is degasified, nitrogen or carbon dioxide can be used as the carrier gas. In a case where carbon dioxide contained in a raw water is degasified together with oxygen, then nitrogen may be used as the carrier gas.

See column 8, lines 26-33.

That is, even if the liquid contains oxygen, Yamamura cannot and does not teach generating "oxygen-rich air." This is because the carrier gas (nitrogen or carbon dioxide) would carry the removed oxygen and the resulting gas would include oxygen and nitrogen/carbon dioxide, which is not oxygen rich air.

Moreover, Yamamura does not teach the specific rate and pressure of Claim 7: *the maximum feed-air flow rate (100 m^3/min m^2 or less) and maximum static pressure (4000 Pa/m^2 or less)*. The Examiner acknowledged as such in this Office Action. *See* OA at page 5, first paragraph.

Claim 7 further recites that a thickness ratio of the permeate-side spacer to the feed-side spacer is 1:2 to 1:10. According to one embodiment, the specific thickness ratio allows efficient separation of oxygen. *See* Table 1 of this application.

Therefore, Yamamura fails to teach the above-indicated features of the claimed invention. Since Yamamura does not teach every element of Claim 7, Applicant respectfully submits that Claim 7 is not anticipated by Yamamura, and thus Claim 7 is allowable over the Yamamura reference.

Discussion of Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 4-6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Yamamura. The Examiner has also rejected Claims 1-3 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Nemser, et al. (U.S. Patent No. 6,126,721) in view of

Yamamura. Applicant respectfully submits that all pending claims are allowable over the prior art of record as discussed below.

Standard of Prima facie *Obviousness*

The Patent and Trademark Office has the burden under section 103 to establish a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-87 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, however, prior art (as opposed to prior art references) must teach or suggest all the claim limitations. "Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*" Federal Register Vol. 72 No. 195 at 57528 (October 10, 2007). Further, the Patent Office must explain why the differences between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. *Id.*

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). M.P.E.P. §2143.01.

Further, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959); M.P.E.P. §2143.01.

To reject a claim based on the rationale of "Obvious to try" (choosing From a Finite Number of Identified, Predictable Solutions, With a Reasonable Expectation of Success), **Office personnel must articulate the following**: (1) a finding that at the time of the invention, there had been a recognized problem or need in the art, which may include a design need or market pressure to solve a problem; (2) a finding that there had been a finite number of identified, predictable potential solutions to the recognized need or problem; (3) a finding that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success; and (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness. M.P.E.P. §2143.

Discussion of Patentability of Independent Claim 4

Independent Claim 4, as amended, recites, among other things, *a fan or a blower for feeding the air into the feed gas channel*, the fan or the blower having such a capacity that a *maximum feed-air flow rate and a maximum static pressure divided by an effective membrane area of the gas separation membrane are 100 $m^3/min \cdot m^2$ or less and 4000 Pa/m^2 or less*, respectively. Claim 4 additionally recites "vacuuming means whereby the hollow section of the core tube is vacuumed to 95 kPaA or less to separate and *recover oxygen-rich air* from the hollow section of the core tube." Claim 4 further recites that a thickness ratio of the permeate-side spacer to the feed-side spacer is *1:2 to 1:10*. As discussed above in connection with the § 102 rejections, Yamamura fails to teach the above-recited features of the claimed invention.

The Examiner stated that while Yamamura does not teach the claimed maximum feed-air flow rate and maximum static pressure divided by an effective membrane, both of these values could be selected as a matter of design choice through routine experimentation by adjusting the size of the membrane module depending on the particular application. Applicant respectfully disagrees.

It appears that the Examiner rejected Claim 4 based on the "obvious to try" rationale. Applicant would like to remind the Examiner that in order to reject a claim based on this rationale, the Examiner must articulate all of the following: (1) a finding that at the time of the invention, there had been a recognized problem or need in the art, which may include a design need or market pressure to solve a problem; (2) a finding that there had been a finite number of identified, predictable potential solutions to the recognized need or problem; (3) a finding that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success; and (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness. M.P.E.P. §2143.

Applicant respectfully submits that at least one of the elements has not been established. The Examiner merely stated that both of the maximum feed-air flow rate and maximum static pressure could be selected as a matter of design choice through routine experimentation. Applicant notes that the Examiner did not provide any design need for such a change, and no predictable potential solutions were provided since no need or problem was recognized. For

example, Yamamura says nothing about the maximum feed-air flow rate and maximum static pressure, and is still working well without considering such parameters. Applicant respectfully submits that since Yamamura is silent about the claimed flow rate and pressure and no design need/problem was recognized, there may be too many numbers or parameters to try, and thus finding or identifying of such specific values may require undue experimentation. As such, it would be difficult for a skilled person to pursue potential solutions, if any, with a reasonable expectation of success.

Furthermore, Applicant respectfully submits that there is no reason or motivation to modify Yamamura to arrive at the claimed invention. As discussed above, Yamamura is directed to a device for removing gas dissolved in liquid by the use of a carrier gas (the output is liquid). In contrast, the claimed invention is directed to obtaining oxygen-rich air from the air (the output is gas). Due to the above distinction, Yamamura includes certain essential elements such as a carrier gas source (33), a liquid supply pump (31), a plurality of holes (6) formed in the mandrel (2), and a high pressure resistant container (32), which are part of or interconnect with the membrane module (1). Applicant respectfully submits that these elements are unnecessary in and would not work for the claimed invention, because those elements are specifically designed to remove gas from the supplied liquid by the use of a carrier gas, instead of obtaining oxygen-rich air. In view of the above, Applicant respectfully submits that the proposed modification of the Yamamura device would change the principle of operation of the prior art invention being modified, and thus the teachings of the reference are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959); M.P.E.P. §2143.01.

In view of the above, Applicant respectfully submits that no *prima facie* case of obviousness has been established with respect to Claim 4, and thus Claim 4 is allowable over the prior art of record.

Discussion of Patentability of Independent Claim 1

Independent Claim 1, as amended, recites, among other things, vacuuming the hollow section of the core tube to 95 kPaA or less by vacuuming means while feeding the air into the feed gas channel by a fan or a blower having such a capacity that a maximum feed-air flow rate and a maximum static pressure divided by an effective membrane area of the gas separation

membrane are 100 $m^3/min \cdot m^2$ or less and 4000 Pa/m^2 or less, respectively, to separate and recover oxygen-rich air from the hollow section of the core tube. Claim 1 further recites that a thickness ratio of the permeate-side spacer to the feed-side spacer is 1:2 to 1:10.

As discussed above, Yamamura does not teach the above-recited features of the claimed invention. Nemser does not remedy the deficiency of Yamamura, because the Nemser reference does not teach at least the *maximum feed-air flow rate (100 m^3/min m^2 or less) and maximum static pressure (4000 Pa/m^2 or less)* as recited in amended Claim 1.

The Examiner stated that while Yamamura is directed to de-oxygenation of water, a skilled person would have recognized that it could also be used to separate oxygen from atmospheric air since the separation membrane is oxygen selective. Applicant respectfully disagrees. First of all, Applicant has not found any disclosure in Yamamura that the separation membrane is oxygen selective. Furthermore, as discussed above, in Yamamura, the carrier gas (nitrogen or carbon dioxide) would carry the removed oxygen and the resulting gas would include oxygen and nitrogen/carbon dioxide. Thus, the Yamamura device cannot selectively generate oxygen-rich gas due to the use of a carrier gas (non-oxygen gas).

Further, Applicant respectfully submits that there is no reason or motivation to combine Yamamura and Nemser to arrive at the invention of Claim 1. As discussed above, Yamamura is directed to removing gas dissolved in liquid by the use of a carrier gas (liquid input and liquid output). In contrast, Nemser is directed to generating oxygen enriched air from the ambient air (gas input and gas output). *See* the abstract and column 1, lines 8-9. Due to the above distinction, Yamamura includes certain essential elements which are part of or interconnect with the membrane module (1), such as a carrier gas source (33), a liquid supply pump (31) and a plurality of holes (6) formed in the mandrel (2). Applicant respectfully submits that these elements are unnecessary in and would not work for the Nemser device, because those elements are specifically designed to remove gas from the supplied liquid by the use of a carrier gas instead of obtaining oxygen enriched air which is the purpose of the Nemser device. For example, if the plurality of holes are formed in the membrane module (4) of Nemser, it would be difficult to effectively generate oxygen enriched air, because the holes would allow for unwanted ambient air to enter the membrane module (4).

In view of the above differences, Applicant respectfully submits that the proposed modification of the Yamamura or Nemser device would change the principle of operation of the prior art invention being modified, and thus the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959); M.P.E.P. §2143.01. Further, the proposed modification would render the prior art invention being modified (either Yamamura or Nemser) unsatisfactory for its intended purpose, because neither of the Yamamura and Nemser device would obtain its intended purpose (generating specific liquid or gas). M.P.E.P. §2143.01.

In view of the above, Applicant respectfully submits that no *prima facie* case of obviousness has been established with respect to Claim 1, and thus Claim 1 is allowable over the prior art of record.

Discussion of Patentability of Dependent Claims

Claims 2, 3, 5 and 6 depend from base Claim 1 or 4, and further define additional technical features of the present invention. In view of the patentability of their base claims, and in further view of the additional technical features, Applicant respectfully submits that the dependent claims are patentable over the cited prior art. Furthermore, Applicant does not necessarily agree with the characterizations of the prior art made by the Examiner in rejecting the dependent claims.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

CONCLUSION

In view of Applicant's foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: August 14, 2009

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